U.B.C. ACTS PROPAGATION EXPERIMENT

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OUTLINE

- STATUS
- SUPPLEMENTAL EQUIPMENT
- SOME PROBLEMS
- NEW PREPROCESSING SOFTWARE
- SAMPLE STATISTICS

STATUS

THE LATEST SOFTWARE UPDATE WAS INSTALLED ON APRIL 24, 1995

THE RAW DATA, AND FAULT AND EVENT LOGS UP TO AND INCLUDING APRIL 1995 HAVE BEEN SENT TO ACTS DATA CENTER

THE DATA FOR NOVEMBER 1994 - FEBRUARY 1995 WAS PREPROCESSED WITH THE NEW SOFTWARE AND SENT TO THE ACTS DATA CENTER

CAPACITIVE RAIN GAUGE CALIBRATION WAS SUSPENDED AS OF JANUARY 23, 1995

HOT AND COLD CALIBRATION WAS SUSPENDED AS OF MARCH 22, 1995

ANTENNA ALIGNMENT CHECKED BY MR. WESTENHAVER AND SIGNAL LEVELS IMPROVED AS OF MAY 23, 1995

SUPPLEMENTAL EQUIPMENT

A THERMOSTATICALLY CONTROLLED RADIANT HEAT SOURCE WAS INSTALLED BEHIND THE DISH ON DECEMBER 30, 1994

It is set to turn on when the temperature drops below 3° C so as to melt any ice or snow before it can accumulate on the dish.

AN AUTOMATIC ILLUMINATION SYSTEM WAS INSTALLED ON JANUARY 30, 1995

It is set to turn on at dusk and off at dawn so as to illuminate the area around the dish. This makes it easier to see this area via the monitoring camera at all times of day.

THE TIPPING BUCKET RAIN GAUGE ON THE ROOF OF THE ELECTRICAL ENGINEERING DEPARTMENT

We are exploring the possibility of disconnecting the gauge from a separate collection computer and connecting it directly to the DACS computer.

AN ACCURATE HUMIDITY "TRANSMITTER" HAS BEEN ACQUIRED (OMEGA ENGINEERING, INC. MODEL HX92; ACCURACY ±2% RH)

It will be used to replace the present humidity sensor, which has been indicating relative humidities higher than 100%.

A NEW RF TEMPERATURE CONTROLLER, FAN, AND SHROUD WERE INSTALLED ON MAY 24, 1995

SOME PROBLEMS

INTERMITTENT NEGATIVE-GOING 1 - 5 DB SPIKES ARE BEING OBSERVED ON THE 27 GHZ BEACON

These appeared during February 18, 1995; existed for several days before disappearing, then returned a few days later. To our knowledge at the time (email requesting information was sent to all sites February 28, 1995), no other site had reported seeing this phenomenon (we now know that the Alaska site is experiencing similar problems). The attenuation remained constant during the periods spikes were observed, however. (see Fig. 1). It is now suspected that the negative-going spikes are due to the master LO, the LO frequency multiplier or the LNA.

HUMIDITY IN THE ANTENNA FEED HORN WAS NOTICED (AGAIN!) ON MARCH 22, 1995

This was indicated by higher than normal radiometer voltage readings and lower than normal beacon signal value readings (on clear days).

The suspected cause is that there was no escape route for any moisture that did make its way into the feed horn.

The feed horn was removed on March 28, 1995, and the feed horn and waveguide were dried. A small hole was drilled in the barrel of the feed horn. Beacon and radiometer levels are now back to "normal."

NEW PREPROCESSING SOFTWARE

We had some difficulties trying to use the software until we received the user's manual on February 20, 1995.

Other problems regarding the new calibration method and relative humidity scaling were solved after consulting with Dr. Crane and Mr. Westenhaver. However, we found that the program that we were using to generate the CDFs could not read the new preprocessed files. New software was supplied by Ali Syed.

Subsequent months will be preprocessed as soon as the ranging tone files are received from the ACTS Data Center. Previous months are currently being preprocessed. There was, however, a problem involving the new preprocessing software; files created by older versions of the data collection software caused it to terminate with various error messages. Mr. Westenhaver provided an updated version of the new preprocessing software that, so far, seems to have solved the problem.

JUMPS IN RADIOMETER VOLTAGE LEVELS WERE OBSERVED SINCE NOVEMBER 29, 1995

The jumps were first noticed in the 27 GHz radiometer voltage levels. Mr. Westenhaver recommended checking and tightening the connectors on the cable at the front end and at the receiver. This seems to have solved the problem at 27 GHz, but we are still seeing occasional small jumps at 20 GHz.

SNOW ACCUMULATION SEEN ON ANTENNA DISH

Occasional heavy snowfalls during February 1995 deposited a relatively large amount of snow on the dish that was not "immediately" melted with the present radiant-heat arrangement. The heater will be repositioned so as to be more effective.

A POWER OUTAGE OCCURRED ON APRIL 13

An extended power outage drained the UPS battery, resulting in loss of data between 7:13 and 7:34 and between 9:53 and 11:56.

SAMPLE STATISTICS

These are shown in Figs. 2 - 4. The data in Fig. 4 excludes the month of July, 1994, when hot and cold calibrations were improperly performed as one of the calibrate buttons was held down by a covering insulating box.

NEW SIGNAL LEVELS

The present signal levels, after antenna adjustment by Mr. Westenhaver, are shown in Fig. 5.

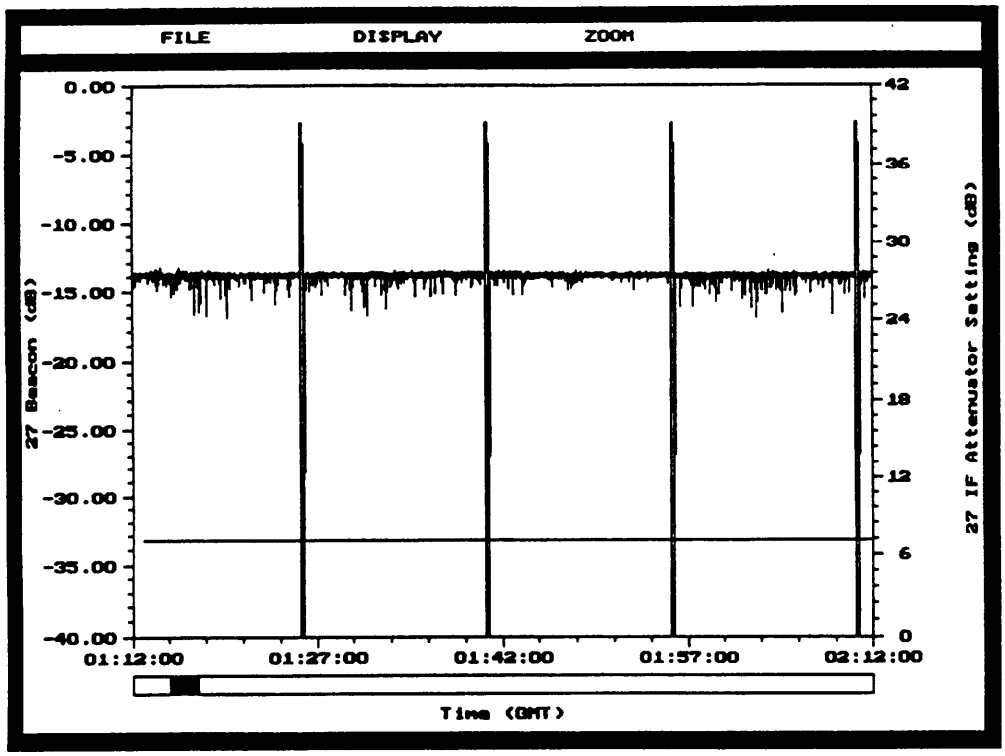

Figure 1: Negative-going spikes as observed on the 27 GHz beacon signal on May 1, 1995.

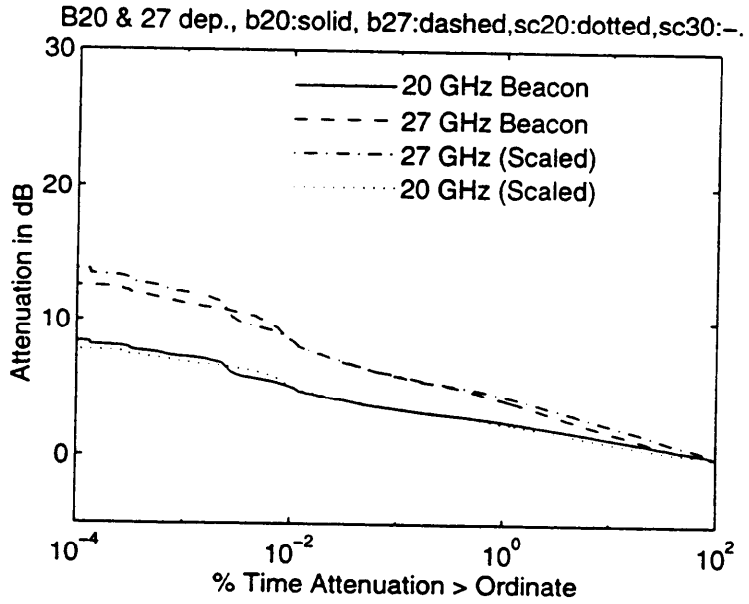

Figure 2: CDFs comparing the 20 and 27 Ghz beacon attenuation with the attenuation scaling model described in CCIR rev. rec. 618-1 for the month of January, 1995.

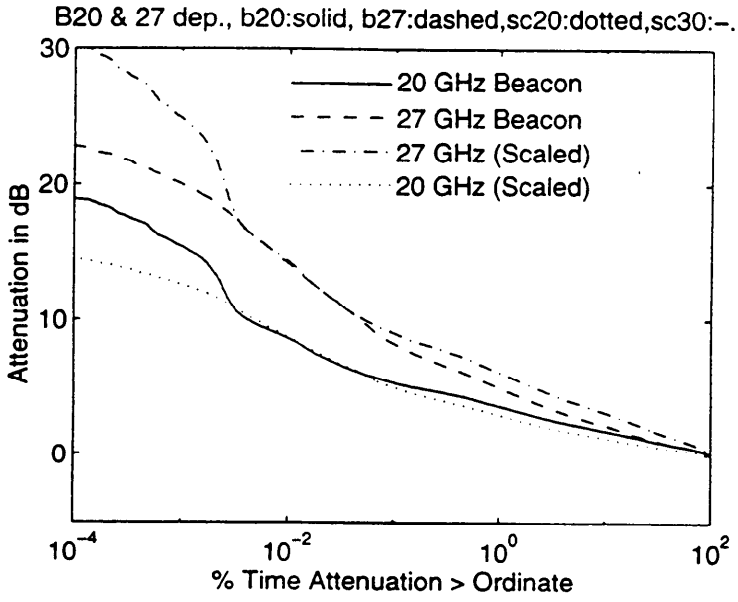

Figure 3: CDFs comparing the 20 and 27 Ghz beacon attenuation with the attenuation scaling model described in CCIR rev. rec. 618-1 for August 1994 - January 1995 inclusive.

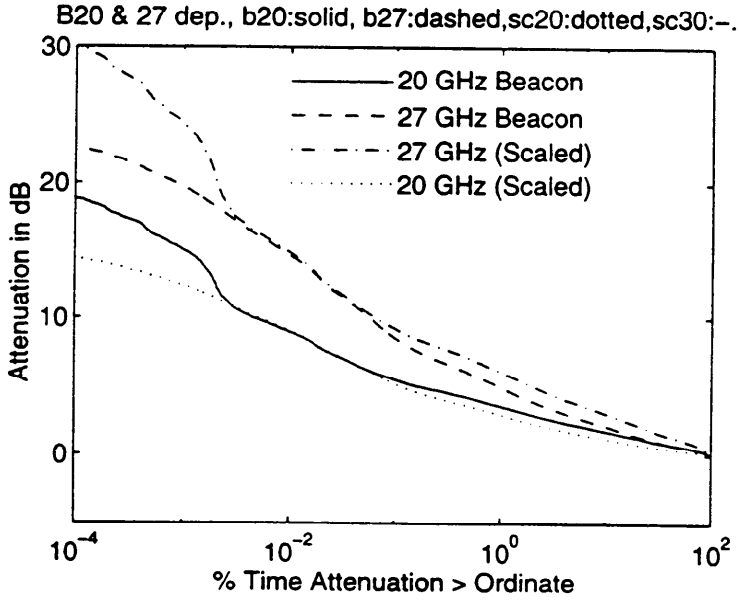

Figure 4: CDFs comparing the 20 and 27 Ghz beacon attenuation with the attenuation scaling model described in CCIR rev. rec. 618-1 for June 1994 - January 1995 inclusive, excluding July 1994.

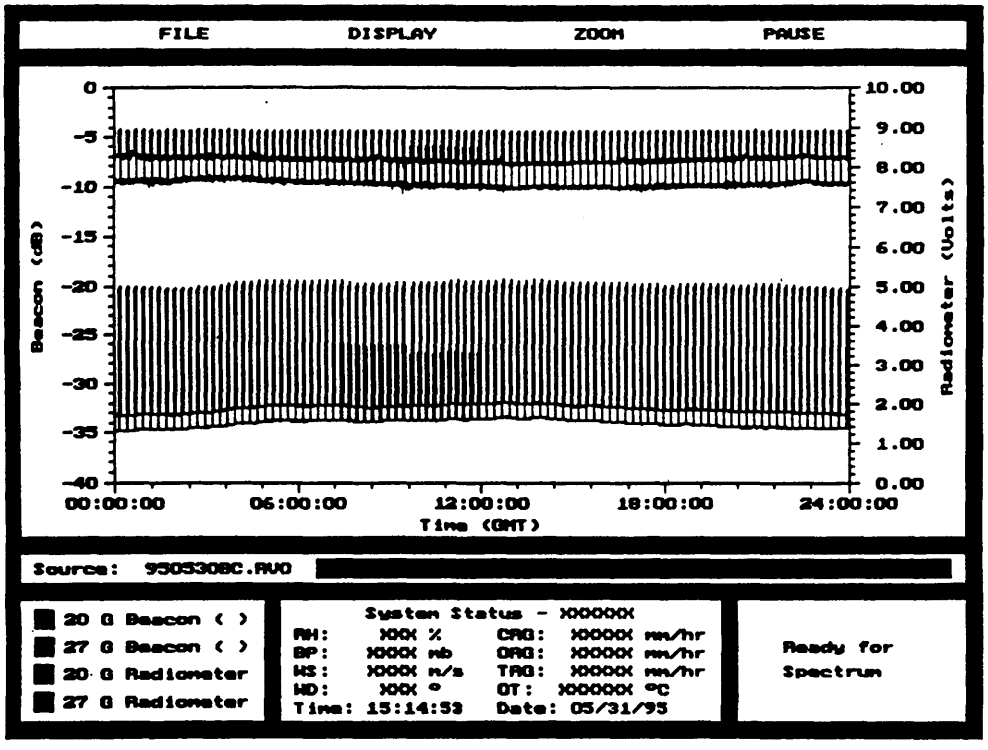

Figure 5: Signal levels for May 30, 1995 (after adjustment by Mr. Westenhaver).